REMARKS

I. ANTICIPATION REJECTION

Claims 15, 17, and 20 were rejected as anticipated under 35 U.S.C. 102 (b) by Bier, et al (US Patent 3,756,104 – referred to as "Bier" herein below).

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention as anticipated under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in ***In re Bond***, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

The following limitations of the applicants' cutting method according to claim 15 are **not** disclosed in Bier:

(1) cutting a continuous moving glass sheet at an angle to its travel direction and across the glass sheet (**step a** of claim 15);

(2) a method of cutting that includes measuring a varying thickness of the glass sheet (**step c** of claim 15); and

(3) varying the cutting force applied by the cutting tool at a number of positions across the glass sheet according to a measured thickness at those positions so that when the thickness increases the cutting force is increased and when the thickness decreases the cutting force is decreased (**last three lines** of **step d** of claim 15).

Bier does not disclose any of the foregoing three method steps of the method claimed in claim 15 for the following reasons.

With respect to the first difference (step a of claim 15) between claim 15 and the disclosures of Bier, the disclosure of Bier describes a method of cutting a glass piece having a predetermined non-rectangular shape from a <u>stationary</u> sheet of glass <u>according to a pattern</u>, as shown for example in figure 4 of Bier and claimed in claim 9 of Bier. Examples of the glass pieces that the method of Bier, et al, is intended to produce are as follows: <u>a blank for a windshield, a sidelight or backlight</u> of the shape shown in fig. 4 of Bier (column 3, lines 32 to 34, of Bier). In fact Bier teaches that the cutting force should be increased <u>at the corners</u> of the cutting pattern (column 4, lines 49 to 52) so that the depth of the score is increased at the corners <u>without regard to the thickness or thickness variations</u>.

Furthermore the "brief summary of the invention" section in column 2, lines 13 to 14, of Bier clearly states that the method of Bier makes a "pattern cut", i.e. cuts a piece out of a glass sheet according to a predetermined <u>pattern</u> (also see that last three lines of the abstract of Bier). This method of Bier is different from making a cross-cut "across the width" of a <u>continuous</u> glass sheet and at an angle to a travel direction. In the case of claim 9 of Bier the cutting tool must travel in a closed path in directions transversely to the travel direction <u>and</u> also in directions longitudinally to the travel direction as shown in fig. 4. Furthermore

claim 8 of Bier does not limit the claimed method to moving the cutting tool at an angle to the travel direction across a moving glass sheet from one side to the other.

In contrast, in the case of applicants' method according to step a of claim 15 the cutting tool moves from one side of the continuous glass sheet to the other side, i.e. "across the width" of the continuous glass sheet, <u>in order to cut panels from the glass sheet</u> (see page 1, lines 22 to 24, of the applicants' specification). The applicants' method is clearly an improved method of <u>cross-cutting</u> a continuously-produced glass sheet with a cross-cutting machine (e.g. see page 2, lines 13 to 23, and page 7, line 6 and line 24 of the applicants' specification).

The last paragraph of the specification of Bier does mention (in a somewhat exaggerated/excited manner) the possibility of operating a <u>pattern cutting machine</u> with <u>a plurality of cutting devices according to their claims</u> so as to cut a glass piece from a series of sheets or from a <u>moving</u> sheet, but Bier does not <u>specifically</u> teach a method of <u>cross-cutting</u> a continuously-produced glass sheet (with a cross-cutting machine) to produce panels at this point in their specification by moving a cutting tool at an angle to the travel direction of the moving sheet.

A <u>generic</u> <u>disclosure</u> of a method does <u>not</u> <u>anticipate</u> a more limited <u>species</u> of a known generic method.

<u>Cross-cutting a continuously produced glass sheet according to the applicants' method is *different* from cutting out a piece from a glass sheet</u>

according to a pattern. Hence applicants' method according to claim 15, step a, is *different* from the methods disclosed in Bier.

Furthermore with respect to step c) of claim 15 Bier does not teach a method including measuring the thickness of their glass sheet **for any purpose**. Furthermore step c) **requires more than** simply measuring the thickness of the glass sheet at a single position on the glass sheet. It also requires that the thickness must be measured at each of the positions across the width of the glass sheet that are traversed by the cutting tool (last part of step a of claim 15).

Bier does not disclose an apparatus with a thickness measuring devices at all, so that the method disclosed in Bier cannot include measuring the thickness of the glass sheet at a plurality of positions across the width of the glass sheet.

Applicants' teach and claim (with claim 15) a method of cross-cutting a continuously-produced glass sheet comprising measuring the thickness of the glass sheet at at least two positions (a plurality of positions) across the glass sheet, which are traversed by the cutting tool. Preferably according to the applicants' disclosure in connection with fig. 2b, at least one of the positions is at the edge of the immediately produced glass sheet and at least one other of the positions would be in the center of the glass sheet.

Bier does recognize that there are small variations in the thickness of the glass sheet that lead to unwanted, uncontrolled or unplanned fluctuations in the depth of the score or fissure in the glass sheet (column 1, lines 40 to 47). However the aim of Bier's apparatus and method is to provide a method for

rapidly controlling the depth of the score or fissure that is produced with their cutting tool as it moves along the cutting line of the cutting pattern according to a predetermined plan for the depth of the score or fissure (column 2, lines 10 to 14, and abstract of Bier). Prior art methods relied on mechanical and pneumatic means for adjusting cutting force that are not sufficiently rapid to respond to the control commands of the plan for adjusting the score depth during traversal of the cutting line.

However applicants' claimed method is still different from that of Biers' method because Bier does **not** disclose or suggest actually **measuring** the thickness profile across a glass sheet, i.e. measuring the thickness along the path traversed (or to be traversed) by the cutting tool at at least two positions along the path. In a practical application of the method represented by Bier there is not reason that one skilled in the art could not rely on a single thickness measurement made by the manufacturer of the glass sheet or general knowledge regarding the process for making the glass sheet. Bier does not provide any guidance regarding this issue in their disclosure or any suggestion that at least two thickness measurements must be known at different positions along the cutting line.

Furthermore the method of Bier does not require the input or knowledge of thickness information. Since Bier is generally interested in varying the score depth according to position of the cutting tool on the peripheral cutting path that is defined by the cutting pattern as explained in column 3, lines 37 to 58, of Bier, knowledge of the thickness is not necessary to determine the cutting force to be

applied or to control the variation in the applied cutting force. In contrast, applicants' method as claimed in claim 15 (step d) requires knowledge of the thickness profile variation or the values of the thickness at the plurality of positions traversed by the cutting tool in order to determine whether or not to increase or decrease the cutting force (step d of claim 15).

Clearly the disclosure in column 3, line 55, to column 4, line 3, of Bier suggests that the method of Bier would determine whether or not breakage occurs by trial and error. Note that column 3, lines 61 to 64, clearly recognize that there is a breakage problem regarding applying too great a cutting force, but their rapidly adjusting cutting tool mechanism does not include any means for sensing when the cutting force would be too great and cause breakage. In contrast the measurement of the thickness profile (step c of claim 15) or thickness at positions traversed by the cutting tool permits applicants to completely avoid breakage despite changes in the thickness of the continuously-produced glass sheet in accordance with the last four lines of claim 15.

With respect to dependent claim 20 any controller of Bier would ignore any thickness measurements and utilize the position coordinates of the corners of the cutting pattern to control the depth of the score according to column 3, lines 33 to 58, of Bier.

The foregoing argumentation should also make it clear that Bier, et al, only provides a means for rapidly controlling cutting force applied to the glass sheet as the cutting tool traverses a cutting line that is defined by a cutting pattern.

However Bier does **not** disclose or suggest that that the cutting force *should* be a function of the varying thickness across the glass sheet as the cutting tool traverses the glass sheet during cross-cutting. The particular example in Bier in column column 3, lines 37 to 58, teaches the opposite – even though one would expect that the thickness at the corners of the blank for the windshield shown in fig. 4 would be about the same as along the sides of the blank, the activating voltage as shown in fig. 5 is increased at the corners so that the cutting force is greater at the corners so as to produce a deeper score at the corners.

Page 3 of the Office Action states that the background section of Bier (column 1, 3rd paragraph) teaches that the cutting tool should be controlled to produce a score or fissure of ***constant*** *depth* as indicated on page 3 of the Office Action. However study of the background section of Bier carefully does not reveal any explicit teaching that the depth of the score or fissure should be constant. Column 1, lines 32 to 55, does not actually state that the cutting tool should be controlled to produce a constant depth score or fissure, but only that the cutting tool should have means for rapidly controlling the cutting force so that the depth of the score or fissure can be rapidly adjust according to any plan or program for varying the cutting force with position long the cutting line. In fact, column 1, lines 22 to 27, confirm that Bier is most concerned with changing the cutting pressure at the corners of the cutting pattern -- without regard to the thickness variations in the glass sheet.

In contrast in the case of the applicants' claimed method if the thickness does not change, the cutting force does not change. According to step d) of claim

15 if the thickness of the glass sheet increases, then the cutting force is increased and if the thickness of the glass sheet decreases, then the cutting force is decreased. At best Bier does **not** disclose or suggest **any** specific relationship between cutting force and the thickness of the glass sheet. In fact Bier suggests changing cutting force at the corners of a cutting pattern where the thickness does not necessarily change.

The cutting machine of Bier facilitates applicants' method as claimed in claim 15 but does not actually disclose the specific method as claimed in claim 15, especially step d) and the last paragraph of claim 15.

For the foregoing reasons withdrawal of the rejection of claims 15, 17, and 20 as **anticipated** under 35 U.S.C. 102 (b) by Bier, et al (US Patent 3,756,104) is respectfully requested.

II. OBVIOUSNESS REJECTION

Claims 15 to 21 were rejected as obvious under 35 U.S.C. 103 (a) over Almar, et al (EP 0 837 042 – referred to as Almar herein below), in view of Bier, et al (US Patent 3,756,104).

The features of the apparatus and method of Bier have been discussed in section I of these REMARKS.

Almar does disclose a cross-cutting machine for automatically cutting away panels from a continuously-produced glass sheet. It does include a cutting

tool for making a score or fissure in the glass sheet and a pressure applying means for acting on the cutting line or score line to break the sheet into two pieces (column 2, lines 4 to 15). The mechanical means for breaking the sheet are controlled by control and operating means including hydraulic valve means for controlling the cutting or scoring and pressure applying means, which in turn are controlled by an electronic controller 57. The electronic controller 57 does receive signals from a sensor 62 (a camera 63 as shown in fig. 4), which "automatically detects the thickness" of the glass sheet (quote is from column 4, lines 53 to 56 of EP '042).

However the camera 63 is not capable of measuring the thickness <u>at a plurality of positions</u> traversed by the cutting tool during formation of the score or fissure in the glass sheet. The measuring sensor 62 (camera 63) only determines a **single average** thickness of the glass sheet and is positioned at a stationary position at the side of the glass sheet to observe the edge of the glass sheet. The purpose of the measuring sensor 62 in the apparatus of Almar is to provide an electronic control signal <u>for selecting the operating program for automatically cross-cutting</u> the sheet on the basis of the <u>single average thickness</u> of the sheet. It is not for the purpose of varying the applied cutting force during the cutting along a cutting line.

In contrast applicants' method claimed in claim 16 involves a continuous measurement of the thickness of the glass sheet during the cross-cutting <u>at a plurality of positions that are traversed by the cutting tool</u> during the cross-cutting. In other words the applicants' method involves not only measuring the overall

average thickness of the glass sheet, but the thickness profile across the glass sheet, i.e. the thickness are many positions across the glass sheet. The sensor 62 of Almar cannot do that because it sits in a fixed position at the side of the moving glass sheet and does not traverse the glass sheet with the cutting tool.

With respect to claim 15 the camera 63 and fixed or stationary sensor 62 would not be able to measure the thickness of a glass sheet at a plurality of positions that the cutting tool is supposed to traverse as it forms the fissure or score.

Furthermore Almar does not disclose or suggest any particular method of varying the cutting force as the cutting tool traverses the glass sheet. <u>Almar does not disclose or suggest the limitations of the steps d) and the last paragraphs of applicants' claims 15 and 16, namely that the cutting force is varied according the thickness variations across the glass sheet.</u> Almar does not disclose or suggest that the cutting force applied by the cutting tool is applied at positions on the glass sheet at which the glass sheet is thicker is greater than at positions at which the glass sheet is thinner.

Thus one reason that claims 15 to 21 are <u>not</u> obvious from a combination of Almar, et al, with Bier is that the combined subject matter of Almar, et al, and Bier does **not** include method steps b and d of independent method claims 15 and 16. Neither prior art reference suggests measuring the thickness profile across the glass sheet, i.e. the thickness at a plurality of positions traversed by the cutting tool during cross-cutting. Also neither prior art references discloses or

suggests the features of step d, namely adjusting the cutting force at the positions traversed by the cutting tool so that it is more or less proportional to the glass sheet thickness at those positions.

Furthermore the modifications of the combined disclosures of Almar and Bier are not reasonably suggested by the prior art in general. It is well established that the prior art must suggest the modifications of the combined disclosures of the prior art references used to reject a claimed invention for a valid obviousness rejection under 35 U.S.C. 103 (a) based on those prior art references. See M.P.E.P. 2141 and following. For example, the Federal Circuit Court of Appeals has said:

> "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification....Here the Examiner relied upon hindsight to arrive at the determination of obviousness. It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." ***In re Fritch***, 23 U.S.P.Q. 2nd 1780, 1783-84 (Fed.Cir. 1992).

In the case of the present invention the reasoning in the final Office Action does not acknowledge some of the above-mentioned limitations that distinguish the claimed invention from the disclosures in Almar and Bier, so that it is not surprising that no reasons for the required modifications of the combined subject matter of these prior art references, which are necessary to arrive at the claimed invention with those limitations have been provided in the final Office Action.

Finally one skilled in the art would <u>not</u> combine the disclosures of Almar with Bier under 35 U.S.C. 103 (a) in the manner suggested on page 3 of the final Office Action because Bier would lead one skilled in the art away from combining the subject matter of the references in this manner.

Almar teach a machine or apparatus for cross-cutting a continuously-produced glass sheet that includes cutting means for making a cut along a cutting line and press means that acts to break the sheet on the cutting line, but also that includes control and operating means comprising **proportional valve means**. The proportional valve means is required by their main claim 1, their abstract and the brief summary at column 2, lines 4 to 21. In other words, the scoring and fissure making tools are <u>pneumatic</u> according to Almar, et al. But Bier clearly teaches that <u>pneumatic</u> <u>cutting</u> tools are **not** adequate because they <u>cannot adjust the cutting force applied by the cutting tool</u> sufficiently rapidly at column 1, lines 16 to 23, of Bier. Thus Bier <u>teaches against</u> a cutting machine or apparatus as claimed in claim 1 of Almar, et al, because it is insufficient for the rapid method of e.g. making cuts in the glass sheet according to a predetermined cutting pattern in which the cut or fissure depth is adjusted during the cutting, e.g. at the corners of the pattern or in general anywhere along the cutting line.

The Almar apparatus is clearly limited to a <u>pneumatic</u> apparatus because the proportional valve operating means 56 shown in fig. 4 supplies the pneumatic actuators 17, 25, and 26, which press the cutting wheels 15, 16, and 18 on the cutting line L on the glass sheet (column 2, line 55, to column 3, line 13). The

valve operating means 56 is controlled by controller 55 shown in fig. 4 as described in column 4, lines 27 to 40.

Thus Almar is limited to a method performed with pneumatically operated cutting tools to form the cut or score in the glass sheet. Also Almar do not disclose varying the cutting force during the cutting along cutting line L. There is no suggestion in Almar of thickness variations across the glass sheet that would require varying the cutting force or variation of the cutting force during a cross-cutting operation for any reason. According to Bier the pneumatic cutting tools of Almar, et al, react insufficiently rapidly to vary the cutting force during the formation of a single score line or cut across the glass sheet *in a controlled manner.*

Thus one skilled in the art would not modify the "method" of Almar using disclosures of particular embodiments of cutting methods according to Bier, because the particular methods of Bier in many cases **could not** be performed by the apparatus of Almar with their pneumatic cutting tools, e.g. cutting out the blanks for the windshield according to a cutting pattern in which the cutting force is greater at the corners of the pattern.

Bier leads one skilled in the art away from combining the subject matter of Almar with Bier in the manner suggested in the final office Action, because Bier states that a pneumatically driven cutting tool cannot be adjusted sufficiently rapidly enough so that the cutting force can be adjusted as the cutting tool traverses a single cutting line.

In summary, Bier teaches away from the proposed combination of the subject matter of Almar, et al, with Bier. For example, see M.P.E.P. 2145 X. D. 2.

For the foregoing reasons withdrawal of the rejection of claims 15 to 21 as obvious under 35 U.S.C. 103 (a) over Almar, et al (EP 0 837 042), in view of Bier, et al (US Patent 3,756,104) is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549-4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

Michael J. Striker,

Attorney for the Applicants

Reg. No. 27,233